Alternative Social Safety Nets in South Sudan: Costing and Impact on Welfare Indicators

Poverty Note

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June 2015

[1] The authors would like to thank Samathida Kem, Nadia Selim, Maya Sherpa and Harsh Vijay for their research assistance.

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Executive Summary

i. *The genesis of this note originates in the realization that part of the huge volume of humanitarian aid which is channeled into South Sudan every year could be channeled to the population via a safety net to increase resilience. This can be done now in the states of South Sudan that are less affected by conflict; while efforts can be scaled up to the remaining states once the current conflict is resolved. At the same time, a peaceful South Sudan that is able to extract oil at full capacity could receive – depending on oil price assumptions – annual net revenues in the region of US$ 0.5 to 1.5 billion making it capable of funding well targeted social safety net programs without recurring to external financial assistance.*

ii. *The second motivating factor relates to the fatigues of years of weak governance and ongoing efforts to find more direct, transparent ways to enable citizens to reap the benefits of independence and peace – once it materializes – including through (cash) transfer. Initial dialogue with representative of Government and civil society has provided a demand for producing broad orders of magnitude on the provision of alternative social safety nets (SSNs).*

iii. *This poverty note responds to this demand by discussing the cost of implementing a SSN program using different targeting schemes and assess the impact on poverty indices. The note purports that gradually switching expenditures to the provision of well targeted SSNs can reduce the chronic dependency on humanitarian (mainly food) aid, which pours into South Sudan at regular intervals. At the same time, it could help to alleviate reliance on patronage networks and switch a portion of the public spending from unproductive uses (e.g., military expenditure) toward strengthening the resilience and supporting the livelihoods of South Sudanese.*

iv. *South Sudan is characterized by ongoing conflict, worsening welfare indicators and historically low capacity. The country has been affected by repeated shocks since independence in June 2011 – first the voluntary oil shutdown in 2012, then the onset of the civil war in 2013 and, more recently, the exogenous shock of oil price decline. The compound effects of these shocks have been devastating for the population of South Sudan. Spending on SSN programs in South Sudan has traditionally been financed by donors in a fragmented way, while the government institutional, human, and financial capacity to deliver services to its population remain limited.*

v. *Moving toward well-targeted SSN programs requires choosing the appropriate targeted population and the type and amount of the transfer. Considering a monetary transfer, four types of targeting schemes are assessed in this note: a) perfect targeting; b) universal transfer; c) geographic targeting; and d) proxy means targeting (PMT). The cost of the selected SSN instrument, based often on budgetary considerations, will determine its feasibility and effectiveness. One impact of the SSN instrument can be measured by the reduction in poverty,*

as assessed in terms of poverty incidence, depth, and severity. The performance and cost-efficiency of the SSN instrument are captured in its coverage and leakage.

vi. *The results of the simulations can be summarized as follows:*

- ***Perfect and universal targeting.*** *Unsurprisingly, the largest poverty reduction of the SSN examined is achieved by perfect targeting, which is a theoretical benchmark. Perfect targeting reduces the poverty headcount from 57 to 46 percent. It does so at the lowest cost, corresponding to 4.57 percent of GDP. Universal targeting achieves the same poverty reduction of perfect targeting but comes at a larger cost, 7.97 percent of GDP. Perfect targeting is not practical due to the problem of identifying the poor on the basis of income – which tends to be under-reported – in context with large informal sectors, as is the case in South Sudan. Universal targeting is a feasible but expensive approach.*

- ***Geographic targeting****. This method can reduce poverty by 7 percentage points, corresponding to an eligibility poverty rate of 52 percent, at a cost of 4.57 percent of GDP. It would cover 57 percent of the population and 72 percent of the poor, with a leakage of 31 percent. Geographic targeting can be more vulnerable to elite and political capture and may be also perceived as 'ethnic' targeting, making it unfit for South Sudan. In addition, areas with large poverty levels before the latest shocks are not well correlated with very poor areas after the shocks. Thus, an SSN based on geographic targeting would not be able to protect the livelihoods and increase resilience of individuals in areas with moderate poverty but – retrospectively – largely at risk and vulnerable to shocks.*

- ***Proxy means tests****. This more sophisticated approach can reduce poverty to 51 percent at a cost of 4.57 percent of GDP. The PMT approach covers 57 percent of the population and 77 percent of the poor resulting in a leakage of 31 percent. In addition, PMT avoids the problem of discrimination while at the same time it introduces a perception of fairness since eligible individuals are identified as poor based on proxy indicators. It also mitigates the problem of excluding households that are vulnerable but only almost poor by defining eligible households based on household characteristics. Such household characteristics can reflect vulnerability more accurately than constraining eligibility on poverty headcount. On the basis of the analysis PMT is suited to the context of South Sudan and should be carefully considered.*

vii. *Formal targeting methods can be complemented by self-targeting to reduce leakages. Self-targeting mechanisms can be incorporated into the selected program by increasing barriers for those applying. As time is often a constraint for non-poor households, time-consuming application procedure can reduce leakage by reducing the incentives for non-poor individuals to apply. However, self-selecting mechanisms can quickly become a deterrent even for poor individuals as experimental evidence suggests. For example, distant cash distribution center*

located far from population centers can exclude the extremely poor without means for transportation. Similarly, requirement of manual labor eliminates those physically handicapped from participating.

viii. *The cost of reducing rural vs. urban poverty is much higher. Reduction of poverty in urban areas is inexpensive given the small proportion of urban households. Urban poverty can theoretically be eradicated by perfect targeting for a cost of below 2 percent of GDP. But poverty reduction in rural areas is expensive. Even a theoretical perfect targeting with a transfer of 20 SSP per individual can only reduce rural poverty from 61 percent to 48 percent at a cost of 4 percent of GDP. Given the breadth and depth of rural poverty, a large part of the population needs to be eligible for a transfer while the transfer must be substantial to lift the household/individual out of poverty. Policy makers need to be aware of the cost of reducing rural poverty in choosing selected programs.*

ix. *This note was developed to provide guidance to policy makers on what can be achieved by providing a transfer to the population and at what cost. It complements the analysis conducted by the Government that underpinned the National Social Protection Policy Framework, as well as a recent World Bank Policy Note on Social Protection. In addition, it underpins the effort to create – in the long run – a solid social protection system, which are supported by the World Bank through its Safety Nets and Skills Development Program, as well as other development partners. Further analytical work will be conducted by the World Bank Social Protection Team to build on this analysis and expand the range of options.*

I. Background and Objectives

1. South Sudan is characterized by ongoing conflict, worsening welfare indicators and low capacity. Even before the current conflict, over half the population (50.6 percent) lived below the national poverty line in 2008[2], while food insecurity routinely affected nearly 2 million people (World Bank 2015). The country displays some of the lowest human development indicators in the world, and infrastructure remains grossly underdeveloped.[3] Formal institutions are being built from a very low base and the capacity of the Government to formulate policy and implement programs is limited, but growing, albeit at quite a slow pace (Larson, Ajak, & Pritchett, 2013).

2. The displacement, destruction and loss of assets have deepened economic and social vulnerabilities. The conflict, which erupted in late 2013, has cost the country 15 percent of GDP and severely impacted welfare indicators. The incidence of poverty increased by seven percentage point nationwide – an additional one million people have been pushed below the poverty line – and the depth of poverty worsened, creating a new class of ultra-poor. Nearly 2.5 million people are predicted to remain in 'emergency' or 'crisis' level of food insecurity in the first quarter of 2015, with an additional 3.5 million in 'stress' status (World Food Programme, 2015).

3. Given the repeated shocks that affect South Sudan and the chronic vulnerability of the population, safety nets programs can play a key role in improving resilience. Non-contributory social safety nets (SSNs) provide a bridge between short-term humanitarian activities and more sustainable, longer-term development efforts. SSNs can provide short-term alternative employment to frustrated, unemployed youth and help to smooth their consumption gaps. Such programs can also target historically marginalized segments of the population, and create productive infrastructures that can contribute to other sectors of development.

4. The purpose of this note is to provide the monetary cost of various social safety net targeting schemes that can be deployed to reduce vulnerability and increase resilience. It is believed that gradually switching to the provision of social safety nets can reduce the chronic dependency on humanitarian (mainly food) aid. At the same time, it could help to alleviate reliance on patronage networks and switch a portion of the public spending from unproductive uses (e.g., military expenditure) toward strengthening the resilience and supporting the livelihoods of South Sudanese. In addition, a social safety net would address the fatigues of years of weak governance and ongoing efforts to find more direct, transparent ways to enable citizens to reap the benefits of independence and – once it materializes – peace. Initial dialogue with representative of

[2] The poverty line used to calculate the poverty rate is 72.9 SSP per person per month, which is approximately equivalent to US$ 32 per person per month, or just over US$ 1 per person daily (World Bank, 2013).

[3] Only 27 percent of the population is literate and the net primary enrollment ratio is 41 percent, with less than one tenth of the entering students completing eighth grade. Less than 1 percent of the population has post-secondary education. Infant mortality is 105 per 1000 births, while the maternal mortality rate is 2,054 per 100,000 births, the highest in the world. Only 44 percent of households live within a 5km radius of a health care facility (World Bank, 2013). Despite being the size of France, South Sudan has less than 200 km of paved roads (World Bank, 2014).

Government and civil society has provided a demand for producing broad orders of magnitude on the provision of alternative social safety nets.

5. Introduction of social safety net in South Sudan can be phased. A safety net could first be introduced in the states of South Sudan that are less affected by conflict. Once the current conflict is resolved, efforts can be scaled up to the remaining states. At the same time, a peaceful South Sudan that is able to extract oil at full capacity could receive – depending on oil price assumptions – annual net revenues in the region of US$ 0.5 to 1.5 billion making it capable of funding well targeted social safety net programs without recurring to external financial assistance.

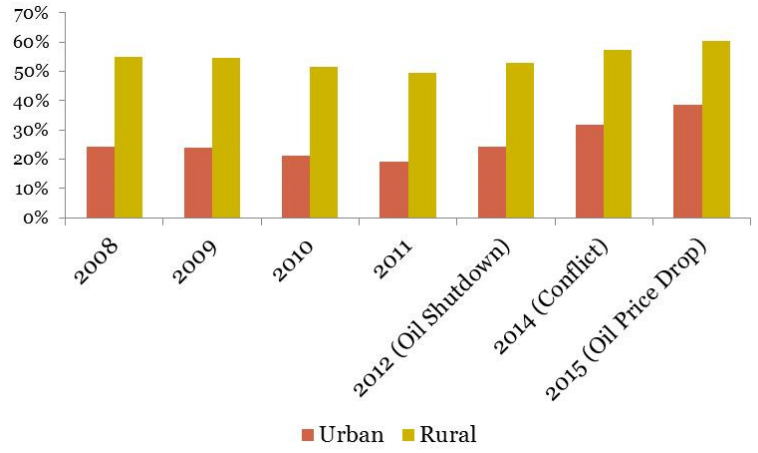
6. The analysis focuses on the impact of a SSN on poverty via a monetary transfer. The focus on a monetary transfer is owed to the ease of presentation. An in-kind transfer can be more appropriate in some contexts like rural areas without a market infrastructure. Conceptually, such transfers are covered by the monetary transfer in terms of the impact on poverty since they equally relax the budget constraint. The impact of the SSN is analyzed on poverty only. While SSNs often aim to reduce poverty, other outcomes like resilience, education, health or employment should also be considered. Poverty is used as outcome measures since it can be easily aggregated and quantified while it correlates well with most other outcome measures.

7. The rest of this paper is organized as follows. Section II provides a snapshot on the impact of conflict on poverty and food security. Section III summarizes the state of play of social protection in South Sudan, including the recent policy options that have been put forward by the World Bank. Section IV and V present the results of simulations on the cost and impact on welfare indicators of alternative SSNs in South Sudan, which crucially complements the existing analytical work on poverty and social protection. Section VI concludes by highlighting some implications of the analysis and the suggested next steps.

II. The Adverse Impact of Recent Shocks on Poverty and Food Security

8. As a result of the conflict, the incidence of poverty in South Sudan has increased and deepened, creating a new class of ultra-poor. Estimates show that the conflict has added an additional 1 million people to the poverty pool. The increase in poverty has been most pronounced in the three states — Upper Nile, Jonglei and Unity, which continue to experience the bulk of the fighting — due to considerable increases in food prices and loss of harvest, as well as displacement. The depth of poverty has also sharply increased in both urban and rural areas, creating a new class of ultra-poor (World Bank, 2014).

Figure 1: Estimates on Rural and Urban Poverty – 2009 to 2015

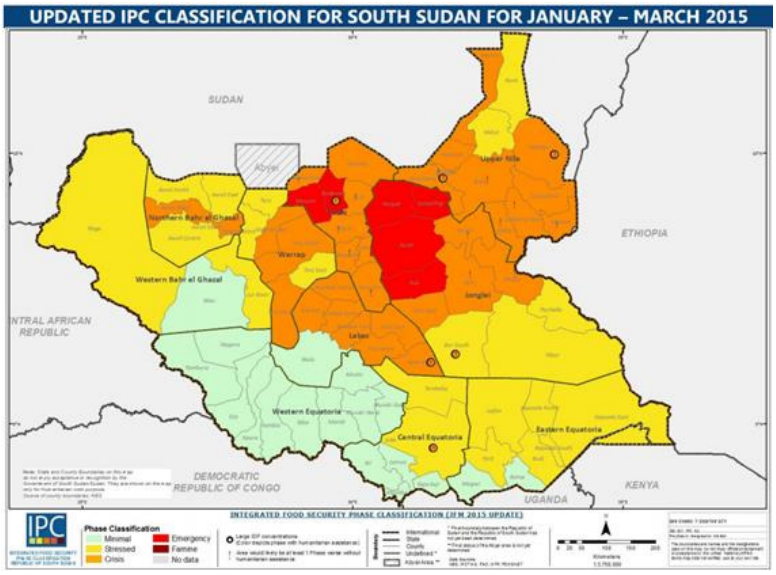


Source: World Bank 2014

9. Food insecurity has increased more significantly than poverty, and has sharply deteriorated since December 2013. Most agricultural markets in the conflict-affected zones and in neighboring states have been severely disrupted. In some instances, even basic staples are not available. Violence and displacement have been one of the main causes of the recent spike in food insecurity. Consequently, the conflict has affected the livelihoods of millions of people – crops have not been planted, livestock are dislocated, and traders have fled – greatly affecting the availability of commodities for local economies (World Bank, 2014).

10. In addition, South Sudan is one of the countries hardest hit by the oil price decline. Net oil revenue accruing to the government from each barrel of crude oil produced is estimated to have declined from USD 44 in June 2014 to USD 17 in January 2015. A fiscal deficit of about USD 1.5 billion is projected in FY 14/15, while the balance of payment position is expected to deteriorate from a surplus to a deficit of over USD 1 billion. More than 40 percent of the population (poor and non-poor) is estimated to be negatively affected by a decline in oil price (World Bank, 2015). The country is now on the brink of economic collapse.

Figure 2: South Sudan Food Security Index



III. Social Protection in South Sudan: A Snapshot

11. Given the repeated shocks that affect South Sudan and the chronic vulnerability of the population, social protection programs[4] can play a key role in improving resilience. In this paper, we focus especially on social safety nets (SSNs), which are non-contributory transfer programs targeted to the poor. These programs usually include school feeding, cash transfers (conditional and unconditional), social pensions, public works, in-kind transfers (e.g., food stamps) and other social assistance programs (e.g., housing allowances, scholarships, fees waivers, etc.) (World Bank, 2012).

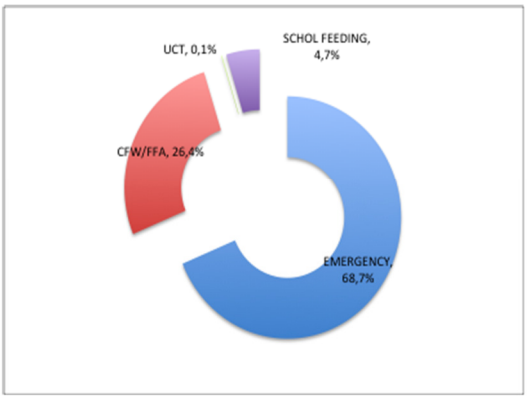
12. Spending on SSNs in South Sudan has been largely financed by donors, with heavy focus on food distribution.[5] There are currently no state-sponsored SSN programs. In 2012, food transfer programs accounted for approximately 98 percent of total SSNs expenditures and covered 70 percent of SSN beneficiaries, a proportion that has likely increased since the recent outbreak of hostilities. School feeding represented an additional 14 percent of beneficiaries (Figure 3). Cash for work and food for work interventions provided assistance to 15 percent of beneficiaries, and unconditional cash transfers addressed a 0.3 percent of total beneficiaries (World Bank, 2015).

[4] Social protection interventions include: (a) social safety nets (cash or in-kind transfers to alleviate poverty); (b) social insurance programs (contributory programs like pensions, unemployment benefits, and health insurance); and (c) labor regulations and active labor market programs (education and training, credit, and employment services).

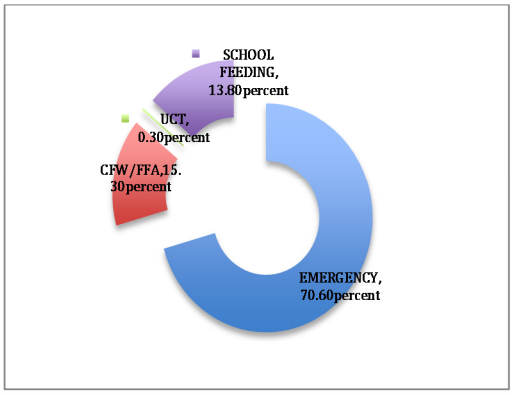
[5] Spending on SSN in 2012 was estimated at US$345 million, or 5.6 percent of the country's 2011 GDP. WFP food transfers, including emergency distribution, school feeding, and food-for-work programs, covered nearly 2.5 million individual beneficiaries at a cost of US$342 million, thus providing for nearly all the spending.

Figure 3: Spending on Social Safety Nets in South Sudan

Spending per Sector of Intervention in SSN (2012)



Beneficiaries' Distribution per Type of SSN program (2012)



Source: Borgarello and Figazzolo, 2013.

13. The Government's vision on social protection is outlined in the South Sudan Development Plan (see Appendix 1) and the National Social Protection Policy Framework. But the Government capacity to deliver on social protection objectives remains limited. This includes a lack of infrastructure and inadequate administrative capacity at the central and local levels. Programs are fragmented and do not exist at a significant scale or as longer-term interventions. There is no viable strategic planning in place, no robust mechanisms ensuring adequacy of benefits, and no clear budgeting procedures. No attempt has been made to date to cost alternative SSNs.

14. The recent World Bank *Social Protection Policy Note* discusses a strategic approach to social protection through a dual track strategy. The strategy seeks to strike a balance between humanitarian and development interventions, and the realities of different states (conflict vs. relative peace). The dual track strategy encompasses both short- and medium-term efforts, which can co-exist based on the Government and development partners' comparative advantage. In the longer run, the objective is to create an integrated social protection system with a well-defined and agreed timeframe, and based on significant capacity building efforts (see Appendix 2).

15. The policy note also stresses the needs for stronger analytical underpinnings and technical know-how. The Social Protection Policy Framework needs to be underpinned by a stronger analytical base. A more thorough analysis of vulnerabilities and coping strategies, available social protection instruments, and identification and quantification of target groups is required to support a more in-depth understanding of the costs and benefits of different approaches (for a rare exception see Bruni and Eddy 2012). Following up on this recommendation, the remainder of this paper focuses on the costing of alternative SSNs and their impact on poverty.

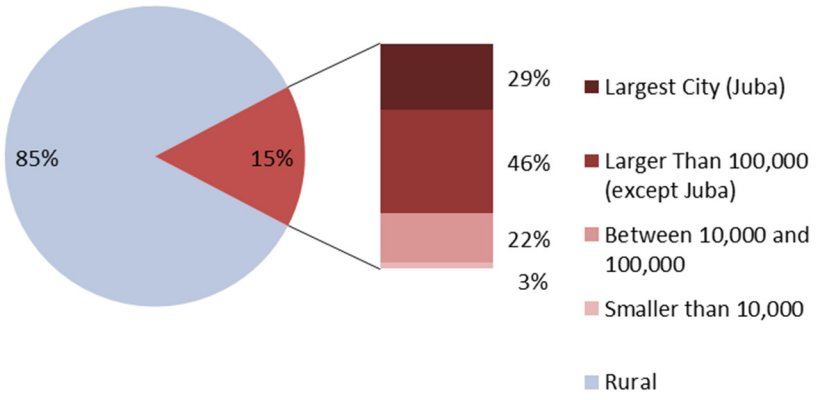
IV. Alternative Social Safety Nets in South Sudan: Cost and Impact

A. Why Social Safety Nets? Opportunities and Challenges

14. South Sudan can implement well-targeted SSNs to reduce its chronic dependence on humanitarian aid and alleviate reliance on patronage networks. The country is heavily dependent on humanitarian aid, which is crucial to save lives.[6] However, many young adults who were born into war have become dependent on such aid, opting to rely heavily on patronage networks (and extended families) while waiting for unrealistic high paying 'government jobs' (World Bank, 2014).[7] Given this context, different modalities of SSNs could contribute to alter this status quo and allow South Sudanese to escape the low-level equilibrium trap.

15. Moving to productive safety nets in rural areas can reduce humanitarian aid dependency and boost productivity. In South Sudan, the majority of the population lives in rural areas (Figure 4). Evidence from the Productive Safety Nets Program in Ethiopia shows it is possible to achieve the twin objectives of food security and increased farm productivity with well-designed programs. Transfers can be used to increase land productivity arising from investments in land, as well as improve local ecology from investments in common resources, and improve access to markets from investments in local roads (Hill, Olinto, Pape, Sherpa, & Sohnesen, 2015).

Figure 4: Population shares in South Sudan by Urban/rural and Major Towns



Source: World Bank's calculation.

16. Similarly, programs can be put in place aiming at creating and upgrading skills in urban areas. This can be achieved through cash transfers combined with vocational and life and business skills training. Only about 17 percent of urban adults in the age bracket 25-44 have benefited from vocational training, despite the fact that access to these programs more than doubles

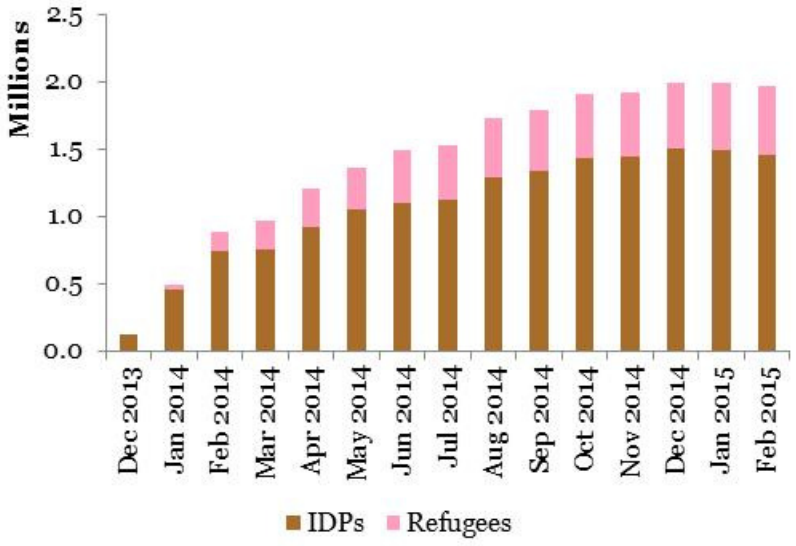
[6] For 2015, a little over USD 1.8 billion is required, of which a bit more than USD 527 million has been received so far. See OCHA South Sudan, http://www.unocha.org/south-sudan.

[7] In rural areas, farmers are unlikely to invest in (surplus) production given the risk of looting by armed forces, malfunctioning (or missing) markets, and insecurity and crime affecting the main routes. Rather, they continue to depend on food aid to make ends meet.

participation in the labor force (World Bank, 2014). Given that the educational background of the young urban male population is better than the average, innovative solutions to upgrade skills can be very useful, particularly as a bridge between basic education and marketable skills.

17. The debate is shifting towards provision of SSNs to deliver the long-awaited peace dividends to the population. Yet, there are significant challenges: the war has displaced nearly 2 million people (Figure 5), making the identification of beneficiary difficult. Most SSN programs continue to be fragmented, lacking coherence and without the benefit of rigorous impact evaluations. But some stakeholders are beginning to realize that SSNs could be a way to deliver to the population the peace dividends that never materialized since independence. The debate is consequently shifting towards 'costing', targeting and the impact of SSNs on poverty.[8]

Figure 5: Internally Displaced Population and Refugees – Dec 2013-Feb 2015



Source: World Bank's calculations.

B. Types of Safety Nets: Targeted Population and Transfer Amounts

18. Moving towards setting up well-targeted SSN programs requires choosing the appropriate targeted population and the type and amount of the transfer. The overarching objective of SSNs, as intended in this paper, is mainly to reduce poverty. Hence, appropriate instruments will have to be chosen to properly target the vulnerable and the poor. To that end, four types of SSNs are examined: a) perfect targeting; b) universal targeting; c) geographic targeting; and d) targeting the poor through a proxy means test. These transfers are described as follows:

[8] The National Social Protection Policy Framework, recently passed by the Council of Ministers, mandate one percent of the national budget to be allocated towards social protection programs. As such, rigorous and evidence based analysis of the cost of different social protection approaches is critical in order to ensure the most efficient use of scarce Government financing.

a. **Perfect targeting**. While perfect targeting of the poor can be evaluated theoretically, its implementation is not practical due to the constraints in identifying individuals as poor solely on the basis of income. Individuals have incentives to understate their welfare in order to qualify for the program's benefits (Gosh & Baker, 1995). Moreover, in a country with large informal sector employment such as South Sudan, income of individuals can be difficult to ascertain, which results in higher leakages and program costs.

b. **Universal transfer**. This is the most straightforward targeting scheme. This scenario does not distinguish between welfare levels of recipients, e.g., disability status, gender, age, employment status, etc. A universal transfer may save on administrative expenses and is easier to implement than alternatives options. However, this cash transfer alone is usually more expensive than other targeting mechanisms due to the larger number of beneficiaries that need to be reached.

c. **Geographic Targeting**. Individuals can also be targeted depending on the poverty prevalence in the village, county or district where they reside. Geographic targeting works well if poverty levels are homogeneous in the areas where the programs are expected to be implemented. For the purpose of the analysis in this note, South Sudan counties were used as geographic areas representing the largest geographic disaggregation of available poverty estimates.

d. **Targeting by Proxy Means Test**. In the absence of reliable records for verification of individual welfare, certain easily identifiable household characteristics can be considered as proxies for welfare. The difficulty is to determine which characteristics are flexible proxies for welfare. While perfect targeting might help to overcome the potential pitfalls from noise in income data, relying on easily identifiable household characteristics is an approximation that results in both inclusion and exclusion errors.[9]

19. The cost of the selected SSN instrument, based often on budgetary considerations, will determine its feasibility and effectiveness. Usually, comparisons between countries are made by indicating spending on SSNs as a proportion of GDP or in per capita terms. In this note, the simulations of the cost and impact of different targeting schemes are developed using transfers of 10 South Sudanese Pounds (SSP) and 20 SSP per month for each individual. In addition, the overall transfer amount is fixed such that the cost of the SSN corresponds to 2 percent of GDP, which corresponds to the average spending in low-income countries.

20. The impact of the SSN instrument can be measured by the reduction in poverty, as assessed in terms of poverty incidence, depth, and severity. The poverty headcount index (P_0) is simply the proportion of the population living below the poverty line (SSP 72.9 per month). The poverty gap (P_1) measures the distance between individuals and the poverty line, calculated as the difference between the poverty line and the consumption of poor households. It can be used to

[9] For the purpose of this analysis, welfare of households was predicted using Ordinary Least Squares (OLS) regression, with the covariates being easily identifiable household characteristics.

determine the minimum cost of bringing all households out of poverty. The severity of poverty (P_3) assigns higher weight to those further below the poverty line by squaring the poverty gap.

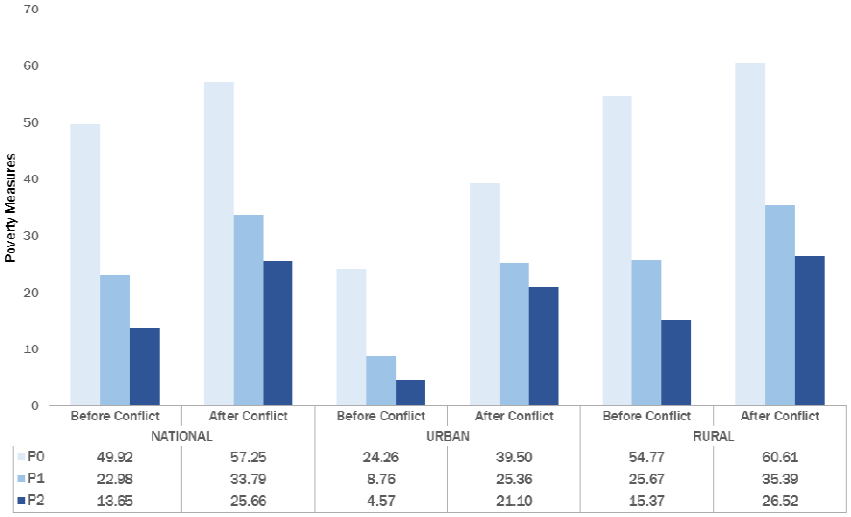
21. The performance and cost-efficiency of an SSN instrument are captured in its coverage and leakage. Coverage is the proportion of eligible recipients chosen through the targeting mechanism. This paper defines the coverage relative to the total population as well as relative to the poor population. Leakage is the ratio of the total number of non-poor who may be erroneously targeted compared to the total number of people targeted by the SSN program. An effective targeting program should have a low leakage ratio. Carefully designed self-targeting mechanisms can reduce inclusion errors.[10]

V. Impact on Poverty

A. Poverty Overview

22. Poverty in South Sudan increased considerably due to recent shocks. Before the conflict, 50 percent of South Sudan's population was below the poverty line, with a poverty depth of about 23 percent. Both the eruption of the conflict in late 2013 and the significant oil price decline of 2014-15 widened the poverty gap by 8 percentage points and deepened it to 34 percent (Figure 6).[11] An additional 1 million people were added to the poverty pool in little more than 15 months, mainly due to loss of harvest and displacement in rural areas resulting from the conflict, raising market prices in the urban areas due to a rapidly depreciating SSP and inflation spikes.

Figure 6: Poverty headcount, depth and severity before and after the conflict, by urban and rural



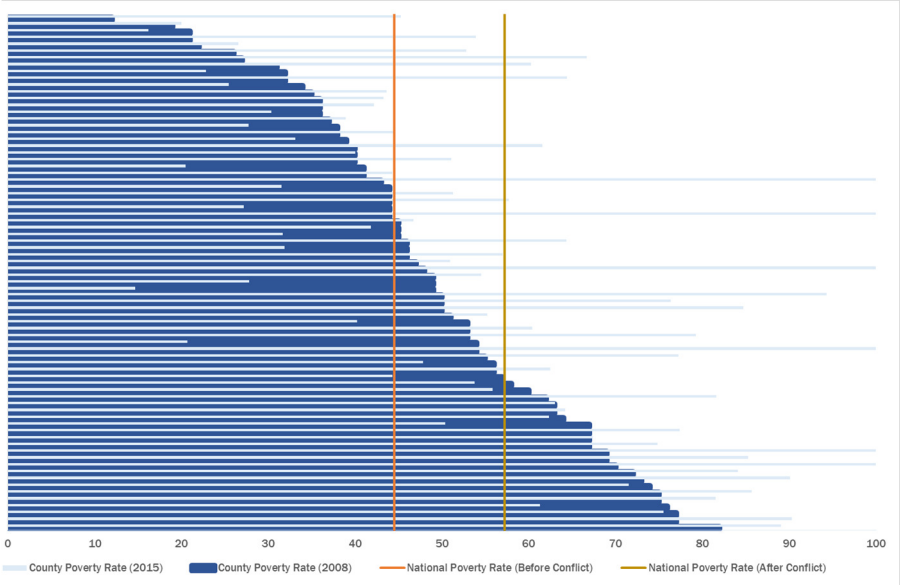
Source: Authors' calculations based on NBHS 2008.

[10] For example, a lengthy registration process involving a long wait in a queue can dissuade people with larger opportunity costs – usually less poor individuals – to register for the program.

[11] Poverty indicators are estimated based on the National Budget Household Survey from 2008 based on real private consumption growth and specific shocks (World Bank, 2014; World Bank, 2015).

23. The change in poverty since the onset of the conflict affected counties independent of their poverty rate in 2008. The recent shocks of the oil shutdown in 2012, civil conflict of 2013, and the oil price decline did not affect poorer counties more than better-off counties (Figure 7). Rather, the conflict affected mostly the north-east quadrant of the country, while the oil price decline increased poverty in counties with larger urban populations. Still, some counties have become considerably better off in 2015 than in 2008. While this is partly due to economic growth during 2008-12, counties with larger agricultural production gained from (food) price increases.

Figure 7: Poverty Rate by Counties – 2008 & 2015 (simulated)



Source: Authors' calculations based on NBHS 2008.

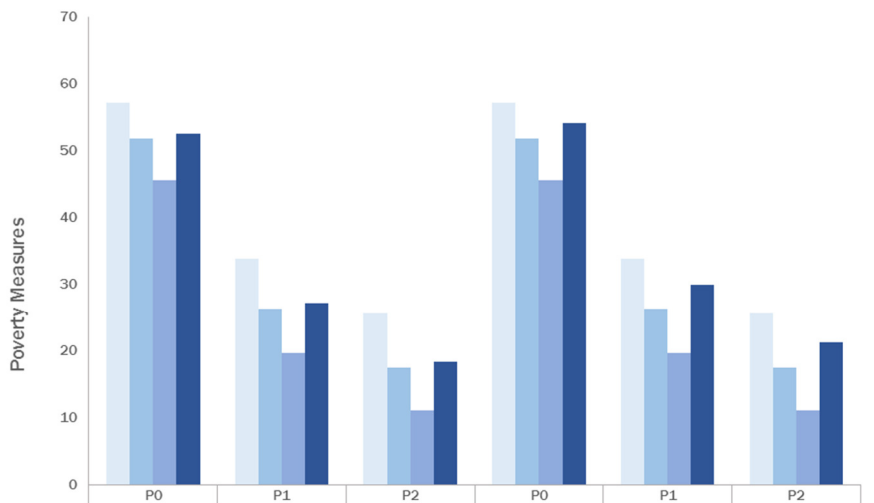
24. Large and unpredictable changes in poverty indicate that universal targeting would be appropriate. Perfect targeting of the poorest could have mitigated the impact of the recent shocks. However, the additional poor created by the combination of these shocks, some of which are outside the control of the Government, illustrate that a SSN targeted only at the poorest would not have helped to reduce poverty, as those remaining outside of the SSN programs would have been still impacted negatively, with significant increases in poverty. This argues for a universal targeting scheme, given the high proportion of households at high risk to slide into poverty.

B. Universal targeting vs. perfect targeting of the poor

25. Simulations shows that universal targeting and perfect targeting of the poor in South Sudan have the same impact on poverty, for a fixed transfer amount. Given the breadth and depth of poverty in the country today, both targeting schemes invariably end up including all poor individuals, and hence, have the same impact on poverty reduction for a fixed transfer amount (Figure 8). A fixed amount of 10 SSP per individual reduces poverty by about 6 percentage points. Doubling the transfer amount to 20 SSP also doubles poverty reduction to around 12 percentage points.

26. However, for a fixed total cost of the SSN program at 2 percent of GDP, perfect targeting of the poor is theoretically the best possible way of achieving poverty reduction.[12] Such a targeting scheme maximizes the transfer amount, entails a transfer of slightly less than 10 SSP, and reaches a reduction in the incidence of poverty equivalent to 5 percentage points (Figure 8). In contrast, universal targeting distributes the total transfer amount to a larger number of individuals, resulting in lower transfer amounts per individual, and only achieves a reduction in the incidence of poverty equivalent to 3 percentage points.

Figure 8: Measures of Poverty for National Population: Perfect vs. Universal Targeting



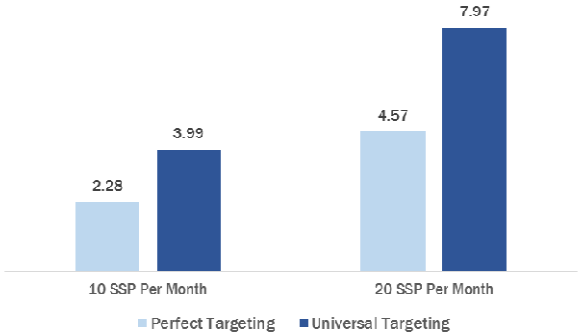
	PERFECT TARGETING			UNIVERSAL TARGETING		
	P0	P1	P2	P0	P1	P2
After Conflict	57.25	33.79	25.66	57.25	33.79	25.66
10 SSP Per Month	51.88	26.33	17.43	51.88	26.33	17.43
20 SSP Per Month	45.62	19.66	11.15	45.62	19.66	11.15
Fixed Cost (2% of GDP)	52.55	27.22	18.34	54.20	29.96	21.28

Source: Authors' calculations based on NBHS 2008.

27. If the transfer amount instead of program costs are fixed, a universal targeting scheme is more expensive than perfect targeting because it entails a higher leakage ratio. Since about half of the population is poor in South Sudan, meaning the other half is non-poor, universal targeting almost doubles the cost for the same transfer amount, i.e. almost 4 percent of GDP (Figure 9). While both targeting mechanisms cover all the poor by design, universal targeting also includes non-poor recipients of the transfer. This results in a substantial leakage of 42.75 percent compared to a leakage of less than 10 percent if perfect targeting is implemented (Figure 10).

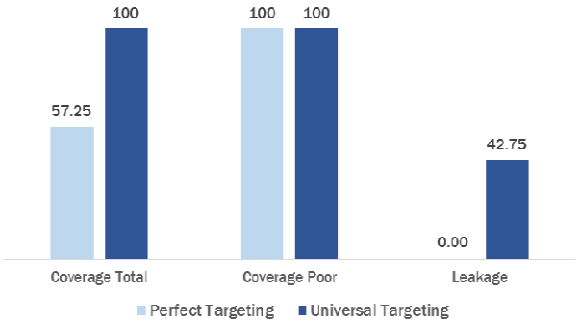
[12] We assume that all eligible individuals receive the same transfer amount.

Figure 9: Cost Comparison as percent of GDP for perfect and universal targeting.



Source: Authors' calculations based on NBHS 2008.

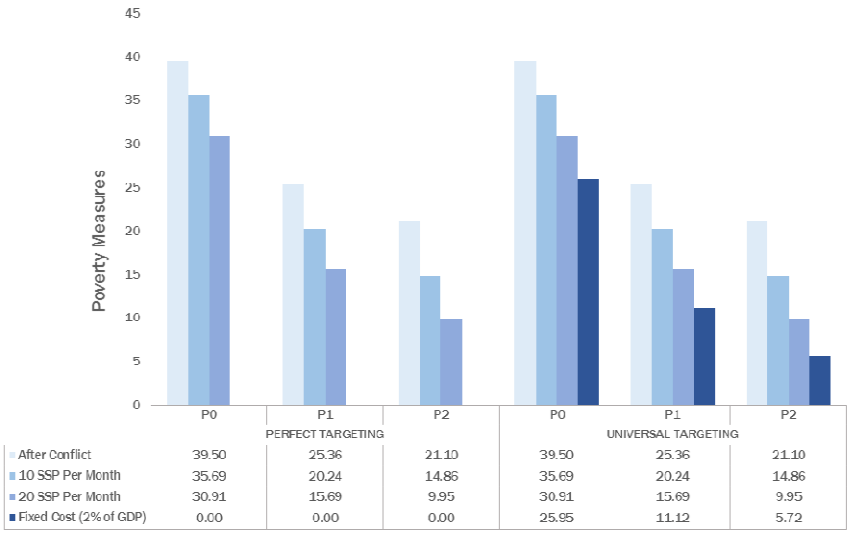
Figure 10: Coverage and leakage for perfect and universal targeting.



Source: Authors' calculations based on NBHS 2008.

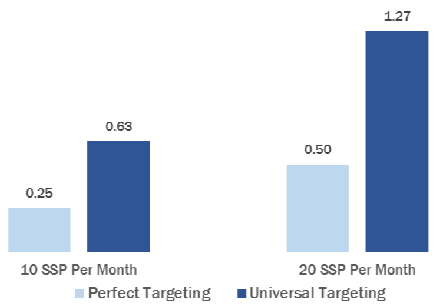
28. In urban areas, where 15 percent of the population resides, a perfectly targeted urban SSN program can eradicate poverty at a cost of 2 percent of GDP. At 2008 GDP levels, 2 percent of GDP (or 680 million SSP) translates into a transfer of 80 SSP per individual per month for a perfectly targeted SSN. With the national poverty line of 72.9 SSP per month, urban poverty can – theoretically – be eradicated (Figure 11). In contrast, a universal targeting scheme at 2 percent of GDP has large leakage to non-poor individuals and, hence, lowers the transfer amount (Figure 12 and Figure 13). Thus, the incidence of poverty declines only from 40 to 26 percent.

Figure 11: Measures of poverty (urban) for perfect and universal targeting.



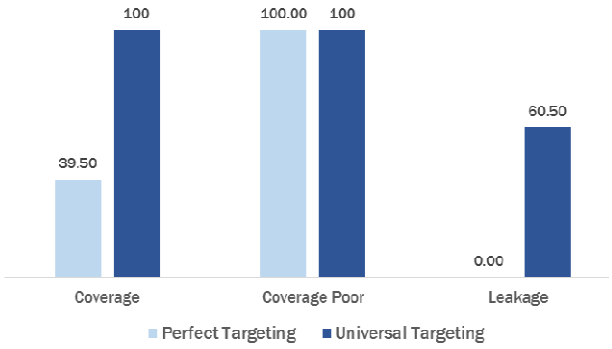
Source: Authors' calculations based on NBHS 2008.

Figure 12: Cost comparison as percent of GDP (urban) perfect and universal targeting.



Source: *Authors' calculations based on NBHS 2008.*

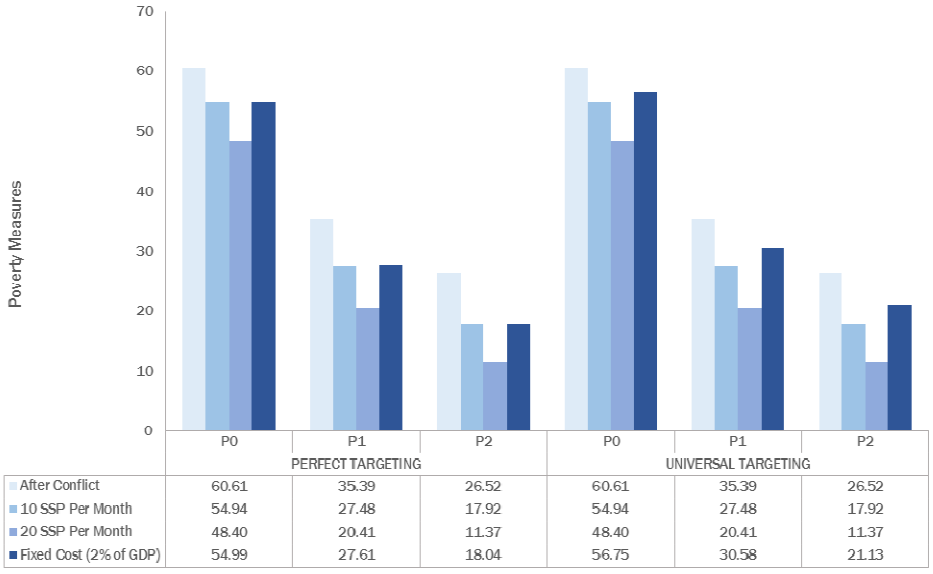
Figure 13: Coverage and leakage (urban) for perfect and universal targeting.



Source: Authors' calculations based on NBHS 2008.

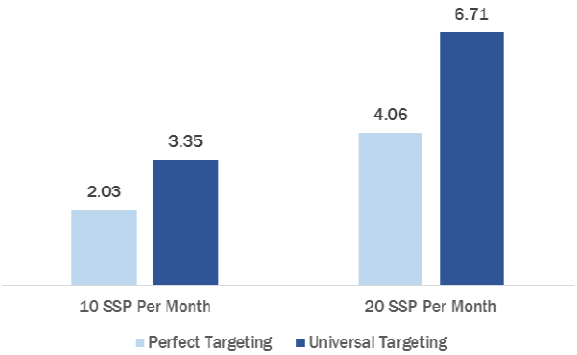
29. The largest cost for poverty reduction is in rural areas, which contains 85 percent of the population and 61 percent of the poor. Some 6.2 million rural people live below the poverty line. Not even a perfectly targeted rural SSN can reduce rural poverty by more than 6 percentage points at a cost of 2 percent of GDP (Figure 14). In addition, program delivery in rural areas has significantly higher implementation and overhead cost. However, given the large number of poor people in rural areas, the difference between a perfectly and universally targeted program is smaller and the latter displays a relatively low leakage (Figure 15 and Figure 16).

Figure 14: Measures of poverty (rural) for perfect and universal targeting.



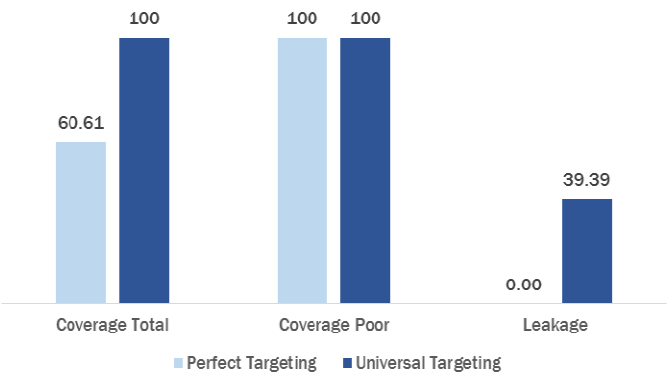
Source: Authors' calculations based on NBHS 2008.

Figure 15: Cost comparison (rural) for perfect and universal targeting.



Source: Authors' calculations based on NBHS 2008.

Figure 16: Coverage and leakage (rural) for perfect and universal targeting.

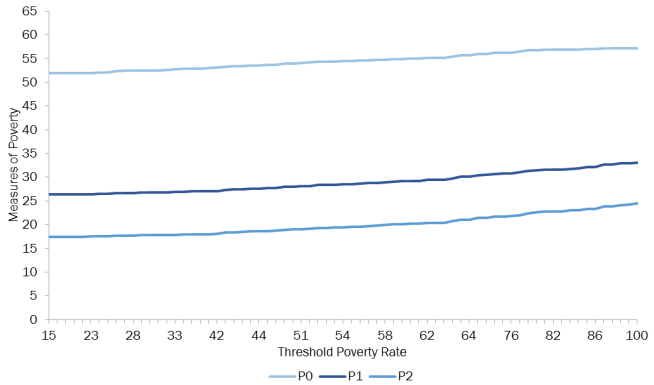


Source: Authors' calculations based on NBHS 2008.

C. Geographic Targeting

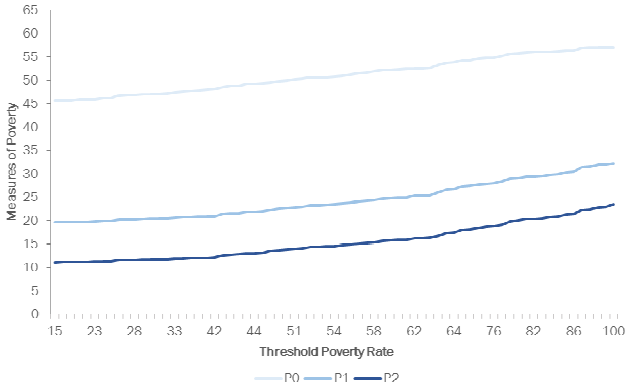
30. Geographic targeting combines ease of implementation with low leakage ratios.[13] In counties with a poverty rate above 25 percent geographic targeting contributes considerably to poverty reduction. Eligibility based on a county poverty rate of 15 percent represents the case of universal transfer, as all counties are eligible for the SSN program (Figure 17 and Figure 18). A gradual increase of the eligibility poverty rate per county progressively removes the countries with lowest poverty from the target group. With a very high eligibility rate, poverty reduction is limited as only very few counties – although the ones with highest poverty – are targeted.

Figure 17: Impact on Poverty – Geographic targeting, 10 SSP per person.



Source: Authors' calculations based on NBHS 2008.

Figure 18: Impact on Poverty – Geographic targeting, 20 SSP per person.



Source: Authors' calculations based on NBHS 2008.

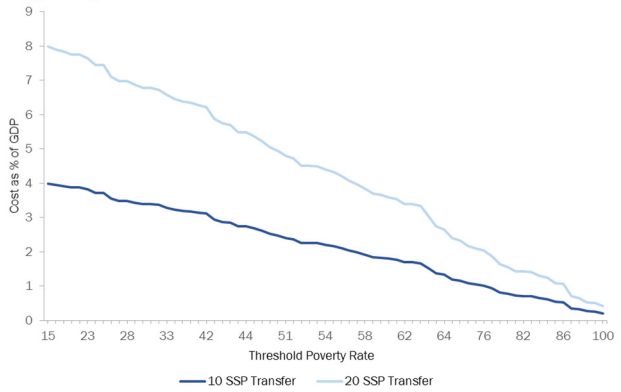
31. A transfer of 20 SSP per individual geographically targeted is more effective in reducing poverty. Similar to other targeting schemes, a transfer of only 10 SSP per individual is not effective in lifting households out of poverty (Figure 17). In contrast, a transfer of 20 SSP per

[13] Geographic targeting defines eligible individuals by their household location. Given a pre-defined threshold, all households in a given administrative area with a poverty rate greater than the threshold are eligible. In the following analysis, counties are selected as administrative areas (see appendix for poverty rates by county).

individual can reduce poverty by 5 percentage points, even if only counties with a majority of poor households are targeted (Figure 18).

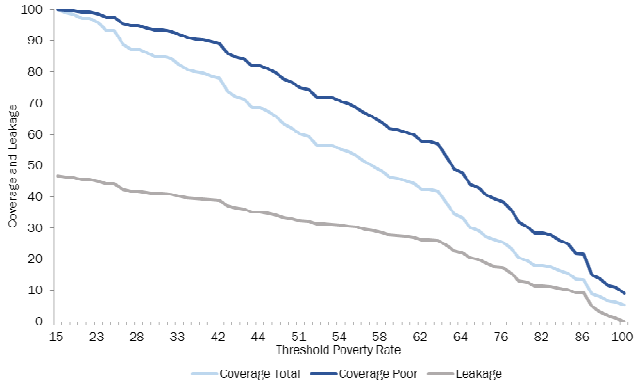
32. The cost of geographic targeting depends on the eligibility threshold and the transfer amount. The cost for geographic targeting is bound by the cost of a universal transfer. An increase in the eligibility threshold lowers the costs while ensuring that counties with highest poverty are still targeted. A transfer of 20 SSP per individual to counties with a majority of poor households would cost about 5 percent of GDP (Figure 19). This would target about 55 percent of the population and 3 out of 4 poor individuals resulting in a leakage of less than one third (Figure 20).

Figure 19: Cost as percentage of GDP for geographic targeting.



Source: Authors' calculations based on NBHS 2008.

Figure 20: Coverage and leakage for geographic targeting.



Source: Authors' calculations based on NBHS 2008.

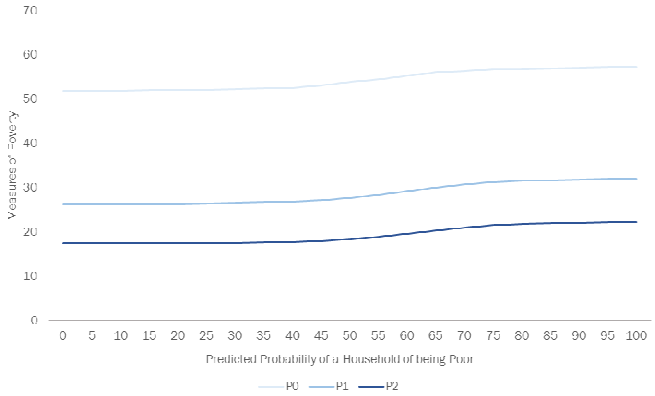
33. Geographic targeting can pose political problems, however. While it has low administrative costs, the selection of beneficiaries based on location can turn into a very sensitive exercise. It runs the risk of political capture of programs, as elites will strive to relax targeting conditions so that their own constituents benefit the most regardless of where the greatest need is. Moreover, geographic targeting could potentially correlate considerably with ethnic concentrations, especially given the displacement patterns caused by the conflict. As such, if utilized, geographic targeting would require careful selections of locations, as well as mechanisms to protect against elite and political capture.

D. Proxy Means Targeting (PMT)

34. Proxy Means Targeting (PMT) selects eligible individuals by observable household characteristics. PMT uses household characteristics that cannot easily be concealed to create a proxy for the household's welfare. These include indicators such as geographic location, type and size of household, household inventory including durable goods, sources of livelihood, and sanitation facilities – all good predictors of household welfare. Other characteristics, more prevalent in poor households, include lack of access to clean drinking water, female household head, house construction material, and overcrowded household. Both sets of characteristics are used on the model to predict households' welfare / poverty (see Appendix for details).

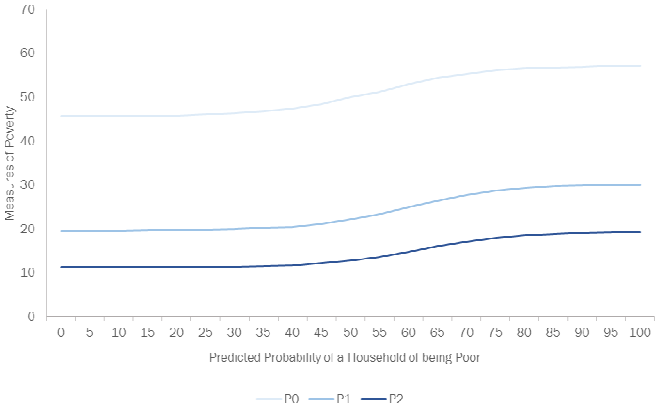
35. In order to determine the eligibility of a household, SSN schemes must consider the likelihood of a household to be poor. The simulation based on the identified model suggests a threshold for the likelihood of a household to be poor to be around 40 percent (Figure 21 and Figure 22). Such choice minimizes leakage while still achieves reasonable coverage of poor households and reducing poverty to 52 percent with a 10 SSP transfer and 46 percent with a 20 SSP transfer.

Figure 21: Measures of poverty using PMT targeting with a transfer of 10 SSP per individual.



Source: Authors' calculations based on NBHS 2008.

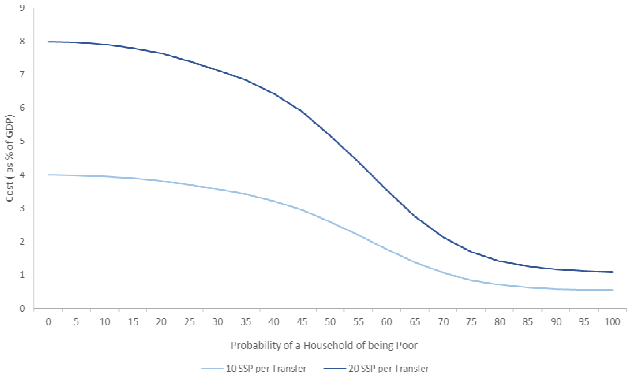
Figure 22: Measures of poverty using PMT targeting with a transfer of 20 SSP per individual.



Source: Authors' calculations based on NBHS 2008.

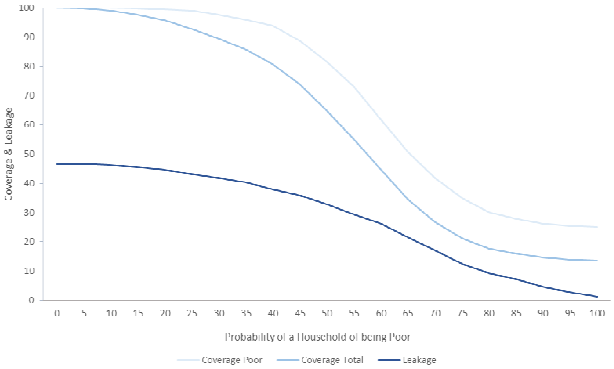
36. In South Sudan, proxy means targeting can achieve a reduction of poverty of 46 percent at a cost of 7 percent of GDP. A universal transfer of 20 SSP per individual reduced poverty to 46 percent at a cost of 8 percent of GDP (Figure 23 and Figure 24). The same reduction of poverty can be achieved with a realistic PMT SSN while saving 1 percentage point of GDP. While PMT incurs additional administering costs compared to a universal transfer, it might overall still be less expensive. It also adds an important element of perceived fairness to the program as an effective proxy is used to disqualify non-poor people.

Figure 23: Cost as percentage of GDP for PMT targeting.



Source: Authors' calculations based on NBHS 2008.

Figure 24: Coverage and leakage for PMT targeting.



Source: Authors' calculations based on NBHS 2008.

Table 1: Summary of the impact on poverty by targeting approach for a transfer of 20 SSP per individual per month. Thresholds for geographic and PMT targeting are set by defining the cost equal to perfect targeting.

		Poverty Measures				Coverage		
	Threshold	**P0**	**P1**	**P2**	**Cost as percent of GDP**	**of total**	**of poor**	**Leakage**
Perfect		45.62	19.66	11.15	4.57	57.24	100	0
Urban		30.91	15.69	9.95	0.5	39.5	100	0
Rural		48.4	20.41	11.37	4.06	60.61	100	0
Universal		45.62	19.66	11.15	7.97	100	100	42.75
Urban		30.91	15.69	9.95	1.27	100	100	60.5
Rural		48.4	20.41	11.37	6.71	100	100	39.39
Geographic	52	50	22	14	**4.57**	30	60	30
PMT	52.5	50.57	22.76	13.19	**4.57**	57.24	77.26	31.1

Source: Authors' calculations based on NBHS 2009.

VI. Conclusions

37. Universal targeting is subject to substantial leakage of transfers to non-poor increasing costs or lowering effectivity of a SSN. Unsurprisingly, the largest poverty reduction of the SSN examined is achieved by perfect targeting, which is a theoretical benchmark. Perfect targeting reduces the poverty headcount from 57 to 46 percent. It does so at lowest cost, corresponding to 4.57 percent of GDP. Universal targeting achieves the same poverty reduction of perfect targeting but comes at a larger cost, 7.97 of GDP. As discussed above, perfect targeting is not practical due to the problem to identifying the poor on the basis of income – which tends to be unreported – and in context with large informal sectors, like South Sudan. Universal targeting could be feasible, but is more expensive than the other targeting programs examined in this paper.

38. Geographic targeting is more cost-efficient than universal targeting but can be perceived as ethnic discrimination. This method can reduce poverty by 7 percentage points at cost of 4.57 percent of GDP (corresponding to an eligibility poverty rate of 52 percent). It would cover 57 percent of the population and 72 percent of the poor, with a leakage of 31 percent. Geographic targeting is more vulnerable to elite and political capture and may be also perceived as 'ethnic' targeting, making it unfit for South Sudan. In addition, areas with large poverty levels before the latest shocks are not well correlated with very poor areas after the shocks. Thus, an SSN based on geographic targeting would not be able to protect the livelihoods and increase resilience of individuals in areas with moderate poverty but – retrospectively – largely at risk and vulnerable to shocks.

39. The more sophisticated PMT approach can reduce poverty to 51 percent at a cost of 4.57 percent of GDP. PMT approach covers 57 percent of the population and 77 percent of the poor resulting in a leakage of 31 percent (**Error! Reference source not found.**). In addition, PMT avoids the problem of discrimination while at the same time it introduces a perception of fairness since only poor individuals are targeted. It also mitigates the problem of excluding vulnerable but only almost poor households by defining eligible households based on household characteristics. Such household characteristics can reflect more accurately vulnerability than constraining eligibility on poverty headcount. On the basis of the analysis PMT is suited to the context of South Sudan and should carefully considered.

40. The cost of reducing rural vs. urban poverty is much higher. Reduction of poverty in urban areas is inexpensive given the small proportion of urban households. Urban poverty can theoretically be eradicated by perfect targeting for a cost below 2 percent of GDP. But poverty reduction in rural areas is expensive. Even a theoretical perfect targeting with a transfer of 20 SSP per individual can only reduce rural poverty from 61 percent to 48 percent and is expensive at 4 percent of GDP. Given the breadth and depth of rural poverty, a large part of the population needs to be eligible for a transfer while the transfer must be substantial to lift the household/individual

out of poverty. Policy makers need to be aware of the cost of reducing rural poverty in choosing selected programs.

41. Formal targeting methods can be complemented by self-targeting to reduce leakages. Self-targeting mechanisms can be incorporated into the selected program by increasing barriers for those applying. As time is often a constraint for non-poor households, time-consuming application procedure can reduce leakage by reducing the incentives for non-poor individuals to apply. However, self-selecting mechanisms can quickly become a deterrent even for poor individuals as experimental evidence suggests (Alatas, et al., 2013). For example, distant cash distribution center can be located far from population centers excluding extremely poor without means for transportation. Similarly, requirement of manual labor eliminates those physically handicapped from participating.

References

Alatas, V., Banerjee, A., Hanna, R., Olken, B. A., Purnamasari, R., & Wai-Poi, M. (2013). Ordeal Mechanisms in Targeting: Theory and Evidence from a Field Experiment in Indonesia. *NBER Working Paper*.

Bruni, L., & Eddy, M. (2012). *The Role of a Local Public Goods Transfer in Promoting Stability and Alleviating Poverty in South Sudan.* Boston: Harvard University.

Gosh, M. E., & Baker, J. L. (1995). *Proxy Means Tests for Targeting Social Programs.*

Hill, R., Olinto, P., Pape, U. J., Sherpa, M., & Sohnesen, T. (2015). *Designing an Urban Safety Net in Ethiopia.* Washington: World Bank.

Larson, G., Ajak, P., & Pritchett, L. (2013). *South Sudan's Capability Trap: Building a State with Disruptive Innovation.* Boston: Harvard Kennedy School.

World Bank. (2012). *Social Protection Strategy for Africa.* Washington: World Bank.

World Bank. (2013). *World Bank Iterim Strategy Note (ISN) for 2013 - 2014.* Washington: World Bank.

World Bank. (2014). *South Sudan Jobs and Livelihoods.* Washington: World Bank.

World Bank. (2014). *South Sudan: Impact of a Continued Internal Conflict on Food Security and Poverty.* Washington, DC: World Bank.

World Bank. (2015). *South Sudan: Social Protection Policy Note.* Washington: World Bank.

World Bank. (2015). *The Fiscal Impact of Declining Oil Prices on South Sudan.* Washington, DC: World Bank.

World Food Programme. (2015). *Situation Report #76.* Juba: World Food Programme.

Appendix 1: The Social Protection Framework in South Sudan

The Government's vision on social protection is outlined in the South Sudan Development Plan (SSDP) 2011-2013. The Plan's stated objective is to '*work progressively to reduce risk, vulnerability, poverty, and economic and social exclusion throughout South Sudan*' (GoSS 2011). The Government established a Social Protection Core Team led by the Ministry of Gender, Child, Social Welfare, Humanitarian, and Disaster Management, with membership of several government institutions[14] and development partners, including the World Bank, World Food Programme (WFP), United Nations Children's Fund (UNICEF), United Nations Development Programme (UNDP), Save the Children, and the Department for International Development (DfID).

The Ministry of Gender, Child, Social Welfare, Humanitarian, and Disaster Management has produced a draft National Social Protection Policy Framework. The overall goal of the Framework is to '*respond to and address the multiple vulnerabilities faced by South Sudanese citizens, with a particular focus on the poorest and most excluded sectors'* (GoSS 2014). The framework identifies the following six objectives: (i) inclusive social protection: ensuring access to basic social services for all; (ii) protective environments for children; (iii) strengthened linkages among social protection, economic development and sustainable livelihoods; (iv) improved livelihoods for women; (v) a systems approach to social protection; and (vi) progressive realization of coverage.

To translate its objectives into interventions, the Framework has identified the following three clusters:

a) *Social assistance to poor and vulnerable persons*, which includes Child Support Grant, School Feeding Program, War Veterans Grant, Foster Family Grant, and Girls' Scholarship Program;
b) *Promoting the participation of poor and vulnerable persons in national economic growth*, which includes the provision of temporary jobs and support for income-generating opportunities; and
c) *Legal reforms to equitably realize constitutional and human rights for all*, which include legislative reforms to protect the right of vulnerable groups, including women and children (GoSS 2014).

The Framework discusses a financing strategy for social protection interventions but stops short of costing alternative options. Social protection interventions are to be jointly funded by the GoSS and international donors in the short-term, with the GoSS gradually funding all interventions in the medium-term.

[14] General Directors from the Ministries of Agriculture, Defense and Veteran Affairs, Education, Finance, Health, Local Government, and the Commission of War Widows & Veterans, and a member of Parliament.

Appendix 2: A Dual-track Strategy on Social Protection in South Sudan

Short term Priorities and Actions

- **Recommendation 1:** Foster greater coordination of humanitarian assistance, under the Oslo Mechanisms umbrella and establish and maintain open safe corridors for humanitarian actors and food traders to alleviate the emergency.
- **Recommendation 2:** Explore the feasibility of implementing alternative social safety programs (e.g. public works, food vouchers, cash transfers), including for IDPs, where markets have not been wholly disrupted and in peaceful areas (scale up SNSDP).
- **Recommendation 3:** Open borders with Sudan to spur trade and relax food prices so that households that rely on food markets can afford a larger food intake. This would also entail a careful monitoring of open borders.

Medium term Policy Options

- **Recommendation 1:** Implement more predictable and more flexible alternatives to humanitarian food aid (e.g., public works, productive SSN, cash transfers), based on an analysis of the functioning of local markets.
- **Recommendation 2:** Conduct a detailed analysis of specific vulnerable groups – including a distinction between temporary and chronically vulnerable to underpin a better targeted and sustainable SSN system.
- **Recommendation 3:** Mitigate the high dependency on food aid by implementing a host of longer-term structural measures encompassing better rural infrastructure (including roads), increases in agricultural productivity, and a competitive exchange rate.

Toward a more Robust Social Protection Policy Framework

- **Recommendation 1:** Move towards a more coherent and robust Social Protection System by achieving better coordination of existing SSN activities and strengthening the analytical base (e.g., costing of alternative SSN, impact evaluation, etc.).
- **Recommendation 2:** GoSS to take greater ownership of the draft Policy Framework and commit more resources to funding SSN, as a means to reduce the importance of patronage networks and increase the proportion of productive spending.
- **Recommendation 3:** Design of SSN interventions with community participation given low government capacity at local levels, through a participatory process that would soak in local level knowledge for better inclusion and equity.

Analytical Work

- **Recommendation 1:** Strengthen the evidence base with respect to costing and impact evaluation of various SSN interventions currently underway, as a critical input for developing a robust and integrated Social Protection Framework.

Appendix 3: Proxy Means Test Model Specification

PMT Model Selection Coefficients			
	Coefficients	Standard Errors	p-Values
Pit latrine (private or shared)	0.263***	0.034	<0.001
Flush (private or shared)	0.547***	0.130	<0.001
Air Conditioner Ownership	0.234	0.144	0.105
Urban	-0.118**	0.037	0.001
Age of Household Head	-0.003**	0.001	0.001
Water access through Deep Boreholes / wells	-0.190***	0.031	<0.001
Water Access through Dams / Wells	-0.249***	0.040	<0.001
Household size	-0.077***	0.005	<0.001
Primary Schooling of Household Head	-0.120*	0.050	0.016
Access to Private / Public Electricity (Y = 1, N = 0)	0.214**	0.070	0.002
Radio Ownership	0.159***	0.033	<0.001
No Schooling of Household Head (Y = 1, N = 0)	-0.168***	0.047	<0.001
Use of Charcoal for Cooking	0.151***	0.046	0.001
Use of Paraffin for Cooking	0.560	0.590	0.343
Computer Ownership	0.301*	0.122	0.014
Overcrowding (#members / #rooms)	-0.044***	0.007	<0.001
Bicycle Ownership	0.102***	0.030	0.001
Use of Mud for Household Construction	-0.174***	0.053	0.001
Use of Wood for Household Construction	-0.296***	0.080	<0.001
Phone Ownership	0.088*	0.041	0.030
Sex of Household Head	-0.091**	0.029	0.002
Constant	5.631***	0.105	<0.001
r2	0.236		
N	4197		

** p<0.05, ** p<0.01, *** p<0.001*

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** p<0.05, ** p<0.01, *** p<0.001*

Appendix 4: Proxy Means Test Simulation Results (10 SSP per month transfer)

Probability*	Coverage Poor	Coverage Total	Leakage	Cost (Million SSP)	Cost (as percent of GDP)	P0	P1	P2
0.00	100	100	46.72	1,355.5	3.99	51.88	26.33	17.43
0.05	100	99.77	46.59	1,352.4	3.98	51.88	26.33	17.43
0.10	99.96	99.15	46.28	1,344.0	3.95	51.89	26.34	17.43
0.15	99.75	97.53	45.51	1,322.1	3.89	51.97	26.36	17.45
0.20	99.56	95.49	44.45	1,294.5	3.81	52.02	26.38	17.46
0.25	98.57	92.71	43.35	1,256.7	3.70	52.11	26.46	17.50
0.30	97.32	89.02	41.75	1,206.8	3.55	52.25	26.57	17.57
0.35	95.95	85.46	40.18	1,158.5	3.41	52.35	26.67	17.65
0.40	93.23	80.22	38.08	1,087.5	3.20	52.63	26.87	17.77
0.45	87.79	72.85	35.79	987.6	2.90	53.18	27.27	18.08
0.50	80.42	63.54	32.56	861.3	2.53	53.91	27.82	18.48
0.55	71.92	53.65	28.57	727.2	2.14	54.51	28.45	18.98
0.60	59.60	42.84	25.88	580.8	1.71	55.41	29.35	19.78
0.65	50.45	34.12	21.21	462.5	1.36	56.10	30.04	20.39
0.70	41.17	26.41	16.95	358.1	1.05	56.31	30.73	21.05
0.75	34.73	21.16	12.56	286.9	0.84	56.72	31.22	21.49
0.80	30.12	17.70	9.35	240.0	0.71	56.79	31.57	21.84
0.85	27.64	15.77	6.61	213.7	0.63	56.85	31.75	22.04
0.90	26.19	14.50	3.75	196.5	0.58	57.12	31.85	22.14
0.95	25.45	13.94	2.74	189.0	0.56	57.18	31.92	22.19
1.00	25.08	13.53	1.27	183.4	0.54	57.21	31.94	22.22

*Probability of being poor for a household, as predicted by the proxy means test.

Appendix 5: Proxy Means Test Simulation Results (20 SSP per month transfer)

Probability*	Coverage Poor	Coverage Total	Leakage	Cost (Million SSP)	Cost (as percent of GDP)	P0	P1	P2
0.00	100.00	100.00	46.72	2,711.1	7.97	45.62	19.66	11.15
0.05	100.00	99.77	46.59	2,704.8	7.96	45.62	19.66	11.15
0.10	99.96	99.15	46.28	2,688.1	7.91	45.64	19.66	11.15
0.15	99.75	97.53	45.51	2,644.2	7.78	45.74	19.70	11.17
0.20	99.56	95.49	44.45	2,588.9	7.61	45.85	19.74	11.19
0.25	98.57	92.71	43.35	2,513.5	7.39	46.18	19.87	11.25
0.30	97.32	89.02	41.75	2,413.5	7.10	46.58	20.06	11.37
0.35	95.95	85.46	40.18	2,316.9	6.81	46.88	20.25	11.49
0.40	93.23	80.22	38.08	2,174.9	6.40	47.55	20.60	11.70
0.45	87.79	72.85	35.79	1,975.1	5.81	48.64	21.32	12.21
0.50	80.42	63.54	32.56	1,722.6	5.07	50.13	22.32	12.88
0.55	71.92	53.65	28.57	1,454.4	4.28	51.33	23.49	13.72
0.60	59.60	42.84	25.88	1,161.5	3.42	53.09	25.17	15.09
0.65	50.45	34.12	21.21	924.9	2.72	54.40	26.47	16.14
0.70	41.17	26.41	16.95	716.1	2.11	55.17	27.80	17.26
0.75	34.73	21.16	12.56	573.8	1.69	56.20	28.73	18.03
0.80	30.12	17.70	9.35	480.0	1.41	56.51	29.39	18.63
0.85	27.64	15.77	6.61	427.5	1.26	56.70	29.74	18.98
0.90	26.19	14.50	3.75	393.0	1.16	56.97	29.93	19.15
0.95	25.45	13.94	2.74	378.0	1.11	57.15	30.05	19.24
1.00	25.08	13.53	1.27	366.9	1.08	57.18	30.09	19.28

*Probability of being poor for a household, as predicted by the proxy means test.

Appendix 6: Geographic Targeting Simulation Results (10 SSP per individual transfer)

Poverty Rate (County Level)	Coverage Poor	Coverb40	Coverage Total	Leakage	Cost (Million SSP)	Cost (as % of GDP)	P0	P1	P2
15	100	100	100	46.72	1,355.5	3.99	51.88	26.33	17.43
16	99.75	99.86	99.02	46.33	1,342.3	3.95	51.92	26.35	17.45
20	99.56	99.86	98.36	46.03	1,333.3	3.92	51.92	26.36	17.46
20	99.12	99.80	97.10	45.47	1,316.3	3.87	51.98	26.39	17.47
21	99.12	99.80	97.10	45.47	1,316.3	3.87	51.98	26.39	17.47
23	98.59	99.17	95.74	44.91	1,297.8	3.82	52.00	26.43	17.52
25	97.49	98.71	93.27	44.11	1,264.3	3.72	52.02	26.52	17.58
27	97.49	98.71	93.27	44.11	1,264.3	3.72	52.02	26.52	17.58
27	95.48	97.47	88.97	42.26	1,206.1	3.55	52.40	26.64	17.70
28	94.71	97.00	87.40	41.73	1,184.7	3.48	52.45	26.70	17.74
28	94.71	97.00	87.40	41.73	1,184.7	3.48	52.45	26.70	17.74
30	94.04	96.77	86.12	41.38	1,167.4	3.43	52.53	26.75	17.77
32	93.40	95.91	84.94	40.94	1,151.5	3.39	52.53	26.80	17.82
32	93.40	95.91	84.94	40.94	1,151.5	3.39	52.53	26.80	17.82
32	93.08	95.85	84.37	40.78	1,143.7	3.36	52.57	26.82	17.83
33	92.00	95.31	82.42	40.17	1,117.3	3.29	52.70	26.90	17.88
39	91.11	94.93	80.89	39.55	1,096.5	3.22	52.82	26.96	17.91
40	90.48	94.30	79.96	39.44	1,083.9	3.19	52.85	27.01	17.95
40	90.18	94.08	79.53	39.27	1,078.1	3.17	52.86	27.03	17.97
42	89.59	93.77	78.70	39.05	1,066.8	3.14	52.98	27.07	18.00
42	89.12	93.55	78.05	38.81	1,058.0	3.11	53.08	27.09	18.02
43	85.89	90.38	73.67	36.97	998.7	2.94	53.30	27.33	18.31
44	84.67	89.33	72.06	36.40	976.8	2.87	53.43	27.42	18.39
44	84.12	88.88	71.33	36.08	966.9	2.84	53.47	27.45	18.42
44	82.04	87.42	68.64	35.01	930.4	2.74	53.61	27.61	18.55
44	82.04	87.42	68.64	35.01	930.4	2.74	53.61	27.61	18.55
45	81.10	86.66	67.43	34.61	914.0	2.69	53.71	27.68	18.61
47	79.69	84.70	65.65	34.00	890.0	2.62	53.73	27.79	18.80
48	77.73	83.22	63.24	33.37	857.3	2.52	53.90	27.93	18.91
50	76.66	82.14	61.96	32.95	839.9	2.47	53.98	28.01	18.99
51	74.96	80.86	60.03	32.27	813.8	2.39	54.12	28.13	19.08
51	74.29	80.25	59.28	32.04	803.5	2.36	54.16	28.18	19.13
51	71.85	77.66	56.55	31.29	766.6	2.25	54.32	28.36	19.35
53	71.85	77.66	56.55	31.29	766.6	2.25	54.32	28.36	19.35
54	71.69	77.54	56.38	31.21	764.2	2.25	54.33	28.38	19.36
54	70.50	76.66	55.11	30.85	747.0	2.20	54.42	28.46	19.43
55	69.78	75.67	54.34	30.57	736.6	2.17	54.46	28.52	19.53
55	68.45	74.82	52.95	30.38	717.8	2.11	54.57	28.61	19.60
56	66.74	73.22	51.18	29.61	693.7	2.04	54.65	28.74	19.71
57	65.34	72.04	49.74	29.14	674.2	1.98	54.68	28.85	19.80
58	63.81	70.80	48.20	28.62	653.4	1.92	54.80	28.96	19.91

Poverty Rate (County Level)	Coverage Poor	Coverb40	Coverage Total	Leakage	Cost (Million SSP)	Cost (as % of GDP)	P0	P1	P2
60	61.94	69.29	46.34	27.74	628.2	1.85	54.90	29.10	20.04
60	61.52	68.82	45.95	27.58	622.9	1.83	54.93	29.13	20.08
61	60.60	67.82	45.08	27.30	611.1	1.80	54.97	29.20	20.17
62	59.85	67.35	44.38	26.91	601.6	1.77	55.06	29.24	20.21
62	57.74	65.23	42.43	26.12	575.2	1.69	55.12	29.41	20.37
63	57.74	65.23	42.43	26.12	575.2	1.69	55.12	29.41	20.37
63	57.02	65.00	41.77	26.05	566.3	1.67	55.21	29.46	20.40
64	52.83	61.15	37.97	24.48	514.7	1.51	55.47	29.77	20.70
64	48.86	57.30	34.42	22.64	466.6	1.37	55.67	30.07	20.98
64	47.65	56.37	33.35	22.13	452.1	1.33	55.71	30.16	21.05
67	44.00	52.35	30.10	20.48	408.1	1.20	55.91	30.43	21.39
67	42.91	51.13	29.17	19.83	395.4	1.16	56.00	30.51	21.48
71	40.64	48.82	27.24	18.64	369.3	1.09	56.19	30.68	21.64
75	39.27	47.36	26.14	17.56	354.4	1.04	56.28	30.78	21.76
76	38.41	46.11	25.49	17.38	345.5	1.02	56.28	30.85	21.88
76	35.82	44.29	23.52	15.59	318.8	0.94	56.49	31.04	22.01
77	31.81	39.97	20.52	13.06	278.1	0.82	56.79	31.33	22.40
77	30.37	37.81	19.45	12.49	263.6	0.78	56.79	31.44	22.60
79	28.38	35.68	17.98	11.47	243.7	0.72	56.84	31.59	22.74
82	28.30	35.63	17.92	11.39	242.9	0.71	56.84	31.60	22.75
82	27.79	35.04	17.56	11.25	238.1	0.70	56.84	31.64	22.80
84	26.07	32.98	16.35	10.66	221.7	0.65	56.87	31.77	22.99
85	24.96	31.94	15.60	10.20	211.4	0.62	56.93	31.86	23.06
85	21.93	28.37	13.55	9.20	183.7	0.54	57.00	32.09	23.30
86	21.73	28.13	13.42	9.15	181.9	0.53	57.00	32.10	23.32
89	14.97	20.68	8.90	4.81	120.6	0.35	57.11	32.63	23.84
90	13.78	19.81	8.13	3.15	110.2	0.32	57.19	32.71	23.91
90	11.51	16.74	6.69	1.93	90.7	0.27	57.20	32.89	24.16
94	10.91	15.87	6.31	1.20	85.5	0.25	57.20	32.94	24.24
100	9.06	13.16	5.19	0.00	70.3	0.21	57.20	33.08	24.50

Appendix 7: Geographic Targeting Simulation Results (20 SSP per individual transfer)

Poverty Rate (County Level)	Coverage Poor	Coverage Total	Leakage	Cost (Million SSP)	Cost (as % of GDP)	P0	P1	P2
15	100.00	100.00	46.72	2,711.1	7.97	45.62	19.66	11.15
16	99.75	99.02	46.33	2,684.5	7.90	45.66	19.69	11.18
20	99.56	98.36	46.03	2,666.5	7.84	45.66	19.72	11.19
20	99.12	97.10	45.47	2,632.6	7.74	45.88	19.76	11.21
21	99.12	97.10	45.47	2,632.6	7.74	45.88	19.76	11.21
23	98.59	95.74	44.91	2,595.5	7.63	45.93	19.84	11.31
25	97.49	93.27	44.11	2,528.5	7.44	46.21	19.99	11.39
27	97.49	93.27	44.11	2,528.5	7.44	46.21	19.99	11.39
27	95.48	88.97	42.26	2,412.1	7.09	46.77	20.21	11.61
28	94.71	87.40	41.73	2,369.4	6.97	46.90	20.31	11.68
28	94.71	87.40	41.73	2,369.4	6.97	46.90	20.31	11.68
30	94.04	86.12	41.38	2,334.8	6.87	47.04	20.39	11.72
32	93.40	84.94	40.94	2,302.9	6.77	47.04	20.50	11.81
32	93.40	84.94	40.94	2,302.9	6.77	47.04	20.50	11.81
32	93.08	84.37	40.78	2,287.3	6.73	47.16	20.53	11.83
33	92.00	82.42	40.17	2,234.6	6.57	47.46	20.66	11.90
39	91.11	80.89	39.55	2,193.0	6.45	47.67	20.77	11.95
40	90.48	79.96	39.44	2,167.8	6.38	47.77	20.85	12.02
40	90.18	79.53	39.27	2,156.3	6.34	47.84	20.89	12.06
42	89.59	78.70	39.05	2,133.7	6.28	48.00	20.96	12.10
42	89.12	78.05	38.81	2,116.1	6.22	48.19	21.00	12.14
43	85.89	73.67	36.97	1,997.3	5.87	48.64	21.45	12.65
44	84.67	72.06	36.40	1,953.5	5.75	48.83	21.61	12.79
44	84.12	71.33	36.08	1,933.9	5.69	48.92	21.68	12.85
44	82.04	68.64	35.01	1,860.8	5.47	49.33	21.96	13.08
44	82.04	68.64	35.01	1,860.8	5.47	49.33	21.96	13.08
45	81.10	67.43	34.61	1,828.0	5.38	49.47	22.08	13.17
47	79.69	65.65	34.00	1,779.9	5.24	49.51	22.30	13.52
48	77.73	63.24	33.37	1,714.5	5.04	49.89	22.55	13.71
50	76.66	61.96	32.95	1,679.8	4.94	50.00	22.71	13.84
51	74.96	60.03	32.27	1,627.5	4.79	50.31	22.93	14.00
51	74.29	59.28	32.04	1,607.1	4.73	50.41	23.03	14.07
51	71.85	56.55	31.29	1,533.2	4.51	50.61	23.38	14.48
53	71.85	56.55	31.29	1,533.2	4.51	50.61	23.38	14.48
54	71.69	56.38	31.21	1,528.4	4.50	50.62	23.40	14.49
54	70.50	55.11	30.85	1,494.0	4.39	50.87	23.56	14.62
55	69.78	54.34	30.57	1,473.2	4.33	50.90	23.66	14.80
55	68.45	52.95	30.38	1,435.5	4.22	51.23	23.84	14.91
56	66.74	51.18	29.61	1,387.5	4.08	51.48	24.08	15.10
Poverty Rate (County Level)	Coverage Poor	Coverage Total	Leakage	Cost (Million SSP)	Cost (as % of GDP)	P0	P1	P2
57	65.34	49.74	29.14	1,348.4	3.97	51.67	24.28	15.25
58	63.81	48.20	28.62	1,306.8	3.84	51.88	24.49	15.44
60	61.94	46.34	27.74	1,256.4	3.70	52.16	24.74	15.67
60	61.52	45.95	27.58	1,245.7	3.66	52.22	24.80	15.74
61	60.60	45.08	27.30	1,222.1	3.59	52.28	24.93	15.90
62	59.85	44.38	26.91	1,203.1	3.54	52.43	25.03	15.97
62	57.74	42.43	26.12	1,150.4	3.38	52.51	25.34	16.25
63	57.74	42.43	26.12	1,150.4	3.38	52.51	25.34	16.25

63	57.02	41.77	26.05	1,132.6	3.33	52.66	25.44	16.30
64	52.83	37.97	24.48	1,029.4	3.03	53.24	26.03	16.80
64	48.86	34.42	22.64	933.2	2.74	53.72	26.59	17.29
64	47.65	33.35	22.13	904.2	2.66	53.86	26.76	17.41
67	44.00	30.10	20.48	816.2	2.40	54.22	27.28	18.01
67	42.91	29.17	19.83	790.9	2.33	54.32	27.43	18.18
71	40.64	27.24	18.64	738.6	2.17	54.62	27.75	18.46
75	39.27	26.14	17.56	708.8	2.08	54.78	27.94	18.68
76	38.41	25.49	17.38	690.9	2.03	54.78	28.08	18.88
76	35.82	23.52	15.59	637.6	1.88	55.22	28.41	19.10
77	31.81	20.52	13.06	556.2	1.64	55.73	28.96	19.80
77	30.37	19.45	12.49	527.2	1.55	55.73	29.19	20.17
79	28.38	17.98	11.47	487.4	1.43	56.00	29.47	20.42
82	28.30	17.92	11.39	485.8	1.43	56.01	29.49	20.43
82	27.79	17.56	11.25	476.1	1.40	56.05	29.56	20.52
84	26.07	16.35	10.66	443.4	1.30	56.08	29.83	20.87
85	24.96	15.60	10.20	422.9	1.24	56.21	29.99	20.99
85	21.93	13.55	9.20	367.3	1.08	56.41	30.44	21.41
86	21.73	13.42	9.15	363.7	1.07	56.42	30.47	21.45
89	14.97	8.90	4.81	241.2	0.71	56.86	31.49	22.34
90	13.78	8.13	3.15	220.4	0.65	57.06	31.65	22.45
90	11.51	6.69	1.93	181.4	0.53	57.10	32.00	22.91
94	10.91	6.31	1.20	171.0	0.50	57.10	32.10	23.06
100	9.06	5.19	0.00	140.6	0.41	57.11	32.38	23.53